The Management of skin tears

What is a skin tear?

“A skin tear is a traumatic wound occurring principally on the extremities of older adults, as a result of friction alone or shearing forces which separate the epidermis from the dermis (partial thickness) or which separate both the epidermis and dermis from underlying structures (full thickness wound).”

( Payne & Martin, 1993 p. 20 )

Who is at risk?

Skin tears are almost exclusively a problem of the frail, elderly population. This is due to changes in the skin, related to ageing.

( White, Karam & Cowell 1994 )

How common are skin tears?

- Sussman (2003) found that up to 25% of all residents in RACF’s had a wound at any one time
- Using the Sussmans figures this could mean that about 12% of all RACF residents have a skin tear at any one time
- This equates to a prevalence of around 19,000 people at any one point in time

How common are skin tears?

1. In a 120 bed nursing facility in Eastern Virginia, there were 227 incidents of skin tears over a 12 month study. The mean age was 85 years old. ( White, Karam, Cowell 1994 )
2. In a 340 bed extended care facility in Western Australia, skin tears accounted for 41.5% of all wounds. The mean age was 80 years old. ( Everett, Powell 1991 )
How common are skin tears?

- More useful is the finding that:
  - Most residents in the nursing home population and other forms of aged care sustain a skin tear at some point in any twelve month period.
  - Figures indicate that the total number of skin tears sustained in nursing homes equates to 2 per resident per year in any RCF without a prevention program in place.
  - Given Sussman’s 2003 finding that each wound (any type – averaged) costs a RCF approx $1005 then total expenditure per 100 NH beds = $201,000. Highly significant!

Skin changes with ageing

As the Rete Pegs flatten with age the epidermis is no longer anchored to the dermis as it should be. This means that the epidermis and dermis can separate with very little force.

The skin loses elasticity and tensile strength. It becomes thin, dry and fragile and appears transparent and wrinkled.

Senile purpura — often a sign that flattening and effacement of the dermo-epidermal junction has occurred within the local area and therefore person is at elevated risk of skin tears.

Factors relating to skin tears

- 50% occurred on the legs, 37% on the hands and arms
- Peak periods were between 1000-1300 and 2000-2100
- 63% involved equipment; bed and chairs being the most common
- 42% of skin tears resulted from knocks
- 33% from falls

Everett & Powell, 1991
Physical factors relating to skin tears

- 79% of patients had fragile skin
- 50% had poor mobility
- 42% had an altered mental state
- 45% were receiving analgesia
- 32% were receiving sedatives

Dressing management of skin tears (from literature…)

- 41% were dressed with a hydrocolloid
- 35% were dressed with Betadine
- 17% had Steristrips applied
- 12% were dressed with paraffin gauze

Risk Calculation…

<table>
<thead>
<tr>
<th>Assessment criteria</th>
<th>Low risk</th>
<th>Medium risk</th>
<th>High risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mobility</td>
<td>Independent</td>
<td>Some assistance</td>
<td>Bed assistance</td>
</tr>
<tr>
<td>Mood state</td>
<td>Normal</td>
<td>Confused</td>
<td>Coma non-responsive</td>
</tr>
<tr>
<td>Drug therapy</td>
<td>No medication</td>
<td>Restricted</td>
<td>Restricted</td>
</tr>
<tr>
<td>Equipment aid (e.g. frame or walker)</td>
<td>No</td>
<td>Walking frame</td>
<td>Frame, More community</td>
</tr>
<tr>
<td>Bowel function</td>
<td>Normal</td>
<td>Incontinent</td>
<td>Very difficult</td>
</tr>
<tr>
<td>Presence of purpura (bruise-like areas)</td>
<td>No</td>
<td>Areas of bruise</td>
<td>Areas of ecchymosis</td>
</tr>
<tr>
<td>Activities of daily living (ADL):</td>
<td>No help</td>
<td>Shaving</td>
<td>Help for ADL</td>
</tr>
<tr>
<td>Polyvalent</td>
<td>No</td>
<td>Moderate</td>
<td>High</td>
</tr>
<tr>
<td>History of diabetes:</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Classification of skin tears

Category I: Skin tears without tissue loss
- Linear type
- Flap type

Category II: Skin tears with partial tissue loss
- Scant tissue loss type
- Moderate to large tissue loss

Category III: Skin tears with complete tissue loss

Classification of skin tears

Category I, without tissue loss

- Linear type skin tear is a full thickness wound which occurs in a furrow or wrinkle of the skin. The epidermis and dermis are separated, as if an incision has been made.

- A flap type skin tear is a partial thickness wound in which the flap can be completely approximated to within one millimetre.

- There is the ability to fully approximate wound edges in Category I skin tears.

( Payne & Martin, 1993 )
**Classification of skin tears**

**Category II, partial tissue loss**

- **Scant tissue loss** defines a partial thickness wound where 25% or less of the epidermal flap is lost and where 75% or more of the dermis is covered by the flap.
- **Moderate to large tissue loss** is a partial thickness wound in which more than 25% of the epidermal flap is lost and more than 25% of the dermis is exposed.

(Payne & Martin, 1993)

**Classification of skin tears**

**Category III, complete tissue loss**

In complete tissue loss the epidermal flap is absent or lost. This may be due to the original or subsequent trauma, during cleansing or from sloughing or necrosis.

(Payne & Martin, 1993)

**STAR CLASSIFICATION SYSTEM**

(FOURTH DRAFT REFINED P-M)

**Category 1**

- **A)** A linear or flap skin tear where the edges can be approximated and the flap appears viable
- **B)** A linear or flap skin tear where the edges can be approximated but the flap viability is unknown due to the presence of haematoma or ischaemia.

**Category 2**

- **A)** A skin tear where the edges cannot be approximated and the remaining flap appears viable
- **B)** A skin tear where the edges cannot be approximated and where the remaining flap viability is unknown due to the presence of haematoma or ischaemia.

**Category 3**

- A skin tear where the tissue flap is absent.
For the purpose of this classification

1. Clean, realign, approximate as well as able and then assess.
2. “Approximated”: as near as possible.
3. “Unknown viability”: if in any doubt of flap viability (due to ischaemia or haematoma) classify as a 1b or 2a as appropriate.
4. Re-classify after 24 - 48 hours or after first dressing change if tissue viability in doubt.

(N. Newall/Expert panel, 2005)

Glossary

• Flap viability: capable of surviving.
• Unknown viability: flap survival is not known or considered compromised because of the presence of ischaemia or haematoma.
• Ischaemia: inadequate tissue perfusion of flap or approximated tissue due to constriction of a blood vessel and is evidenced by pallor, duskyness, hypoxia, darkening or bruising.
• Haematoma: a collection of blood or clot under the flap or tissue.
• Approximate: to align the tissue or flap as near as possible.
• Realign: to replace the tissue into the normal anatomical position without undue stretching.
• Linear skin tear: a skin tear that results in a straight line.
• Flap skin tear: a curved segment of tissue that is dissected away from the adjacent tissue.

(N. Newall/Expert panel, 2005)

Goals of wound management

• Identify patients at risk and implement preventative measures
• Thorough wound and patient assessment
• Identify and where possible, control factors that may affect wound healing
• Protect from further trauma
• Promote a moist healing environment
• Select a dressing that can be removed painlessly and does not traumatize the healing wound, or the surrounding delicate skin.
• Evaluate and document healing process.

Wound management strategies

• Assess patient/ensure safety
• Cleanse wound with potable water or sterile saline
• Arrest haemorrhage
• Realign skin flap if possible
• Whilst it is “traditional” to use steristrips for flap realignment it is now becoming common to use Silicone foams
• Assess category

Choose primary dressing:

- Alginate if bleeding (will macerate steristrips)
- Foam if bleeding minimal or serous exudate present – silcone/gel foam preferable and can be used for skin flap re-alignment
- Hydrocolloid can be used if extreme care taken on removal (Cutinova Hydro) – more likely to be used on category 3
- Acticoat/Aquacel/Blatain Silver/Mepilex Ag indicated for infection

Choose secondary dressing:

- If alginate used consider non strike through options with Sofban and tubular bandage or crepe
- Foam if bleeding minimal or serous exudate present with Sofban and tubular bandage or crepe (no adhesive border)
- Ag dressings: consider non strike through options with Sofban and tubular bandage or crepe – many alternatives
- Ensure padded protection covers all secondary dressings – should not tourniquet!
Wound treatment decisions

Categories and types of skin tears are useful in determining an appropriate treatment protocol. However, they do not provide sufficient information on which to base wound treatment decisions.

A thorough wound and patient assessment is required, with continual evaluation and documentation.

Payne & Martin, 1993

Acknowledgements

• National expert panel: STAR project (Silver Chain Nurses Association) 2005
• N. Newall – project coordinator: STAR
• M. Moncrieff
• Payne and Martin (1993)

Skin Cancers

Epidemiology

Newly diagnosed skin cancers comprise:

• 80% basal cell carcinomas (BCC)
• 16% squamous cell carcinomas (SCC)
• 4% melanomas (Dewald, 2002)

Epidemiology

• There are approximately 80,000 new cases of potentially fatal cancer in Australia each year with some 33,000 deaths (Burton, 2003)
• Skin cancer is the commonest cancer treated in Australia (Ackerman, 2003; Stockfleth et al, 2006; Bynes et al, 2007)
• In Australia it accounts for more than 80,000 patient encounters each year with the incidence of melanocytic and the more frequently diagnosed non-melanocytic skin cancers increasing (Bynes et al, 2007)
• There is a latitudinal gradient in Australia for BCC and SCC rates, both of which are higher in northerly areas (National Cancer Control Initiative, 2003)
Epidemiology

- The 20th-century trend for fair skinned individuals to have deep sun tans have resulted in widespread skin cancer (Diepgen et al, 2002)
- Between 1993-1994 Australia’s direct health care expenditures for skin cancer accounted for approximately $16 / person / year and exceeded that spent on other forms of cancer
- Approximately 1.5% of Australians undergo an excision of at least one skin cancer / year with about 10,000 of these being invasive melanomas (Borton, 2000)
- Cutaneous metastases occur in about 5% of patients with solid tumours and are generally associated with widespread disease (Halpern & Myskowski, 2002b)

Squamous cell carcinoma (SCC)

Definition

- Primary cutaneous squamous cell carcinoma (SCC) is a malignant tumour that may arise from the keratinizing cells of the epidermis or its appendages. It is locally invasive and has the potential to metastasize to other organs of the body. (Motley, R et al 2002)

SCC – Aetiology

- Prolonged exposure to sunlight, UV light
- Age (>50)
- Male>female
- Skin type 1 – non tanning/freckling/burns easily
- Blue eyes, fair/red hair
- Caucasian
- Pre-existing inflammatory skin conditions
- Immunosuppression
- Tobacco exposure
- Ionizing radiation
- Previous history NMSC

SCC – Clinical presentation

- SCC usually presents as an indurated nodular keratinizing or crusted tumour that may ulcerate, or it may present as an ulcer without evidence of keratinization. (Motley, R et al 2002)
- The characteristic invasive squamous cell carcinoma is a raised, firm, pink-to-flesh-coloured keratotic papule or plaque arising on sun-exposed skin
- Approximately 70% of all squamous cell carcinomas occur on the head and neck, with an additional 15% found on the upper extremities.
- Surface changes may include scaling, ulceration, crusting, or the presence of a cutaneous horn
- the absence of surface changes should raise suspicion of a metastatic focus from another skin or non skin primary site or a different and potentially more lethal tumour
SCC - Diagnosis

- Morphological presentation (how lesion looks) is often the primary diagnostic.
- Clinical presentation combined with a relevant medical history are likely to be definitive, however, lesions are typically subjected to histological (microscopic cellular) examination in order to confirm diagnosis.
- This step is also important to rule out other more lethal skin cancer types and to determine level of local tissue invasion.
- Diagnostic techniques:
  - Biopsy (tissue sample)
  - Histology

Actinic Keratosis - AK

Definition

- An early in situ SCC, identified in 40–50% of Australians aged over 40 years.
- Commonest malignant lesion of the skin
- Approximately 5–20% of AKs will transform into SCC within 10–25 years.
- Patients with AKs have approximately 6.1% - 10.2% risk of malignant transformation. (Roewert-Huber et al, 2007a)

AK - Aetiology

- Prolonged exposure to sunlight, UV light
- Age (>40)
- Male>female
- Skin type 1 – non tanning/freckling/burns easily
- Blue eyes, fair/red hair
- Caucasian
- Pre-existing inflammatory skin conditions
- Immunosuppression
- Tobacco exposure
- Ionizing radiation
- Previous history NMSC

AK – clinical presentation

- AK usually presents as an indurated nodular keratinizing or crusted tumour. (Motley, R et al 2002)

  The characteristic AK is:

  - a raised, firm, pink-to-flesh–coloured keratotic papule or plaque arising on sun-exposed skin
  - Surface changes may include scaling, ulceration, crusting, or the presence of a cutaneous horn
AK - Diagnosis

- Morphological presentation (how lesion looks) is often the primary diagnostic.
- The clinical presentation combined with a relevant medical history are likely to be definitive, however, lesions may be subjected to histological (microscopic cellular) examination in order to confirm diagnosis.
- Diagnostic techniques:
  - Clinical examination
  - Biopsy (tissue sample)
  - Histology

Basal Cell carcinoma - BCC

Definition

- Basal cell carcinoma arises from the basal layer of the epidermis or skin structures such as hair follicles or sebaceous glands.
- It can be found anywhere on the skin surface, although BCC occurs most commonly on the head and/or neck.
- It is a slow growing tumour that rarely metastasizes.

(Practice Parameters, Skin Lesions, American Society of Plastic Surgeons, 2003)

BCC - Aetiology

- Prolonged exposure to sunlight, UV light
- Age (>40)
- Male > female
- Skin type 1 – non tanning/freckling/burns easily
- Blue eyes, fair/red hair
- Caucasian
- Pre-existing inflammatory skin conditions
- Immunosuppression
- Tobacco exposure
- Ionizing radiation
- Previous history NMSC

BCC – clinical presentation

- Nodular – slightly translucent, waxy or pearly papule or nodule with surrounding and overlying telangiectasia
- Superficial – erythematous, telangiectatic well-demarcated macule with fine scale
- Sclerosing (morphia) – ill-defined flat or depressed hypopigmented or yellowish indurated plaque, sometimes with overlying telangiectasia
- Fibroma-like: moderately firm nodule with a smooth pink surface
- Secondary changes may include ulceration, crusting, scaling, pigmentation, cystic collection, or scarring

(Practice Parameters, Skin Lesions, American Society of Plastic Surgeons, 2003)
BCC - diagnosis

- Morphological presentation (how lesion looks) is often the primary diagnostic.
- The clinical presentation combined with a relevant medical history are likely to be definitive, however, lesions are typically subjected to histological (microscopic cellular) examination in order to confirm diagnosis.
- This step is also important to rule out other more lethal skin cancer types and to determine level of local tissue invasion.
- 
  Diagnostic techniques:
  - Clinical examination
  - Biopsy (tissue sample)
  - Histology

Melanoma

- Definition

  - Melanoma is a malignancy of pigment-producing cells (melanocytes) located predominantly in the skin, but also found in the eyes, ears, GI tract, leptomeninges, and oral and genital mucous membranes.

- There are four major types of melanoma, characterized as:

  - Superficial spreading: Appears most often on the torso in males and the legs of women. It usually appears as a plaque with irregular edges and variegated coloration. Patients may note a change in size or colour.
  - Nodular: May occur anywhere on the body. It tends to grow vertically. It tends to be dark, pearl grey to black and may enlarge rapidly.
  - Lentigo maligna: Appears most often on the face or other sun-exposed areas of the skin. It is usually an asymptomatic flat tan or brown macule with darker brown or black spots on its surface. It most often occurs in older individuals.
  - Acral lentiginous: Arises on the palm, plantar or subungual skin. Evaluation of colour, shape and growth are important for proper diagnosis of this condition.

  (Practice Parameters, Skin Lesions, American Society of Plastic Surgeons, 2003)

Melanoma – Clinical presentation

- A new or changing mole or blemish is the most common warning sign for melanoma.
- Variation in colour and/or an increase in diameter, height, or asymmetry of borders of a pigmented lesion are noted by more than 80% of patients with melanoma at the time of diagnosis.
- Symptoms such as bleeding, itching, ulceration, and pain in a pigmented lesion are less common but warrant an evaluation.


Melanoma – Clinical presentation

- Asymmetry: Half the lesion does not match the other half.
- Border irregularity: The edges are ragged, notched, or blurred.
- Colour variegation: Pigmentation is not uniform and may display shades of tan, brown, or black, white, reddish, or blue discoloration is of particular concern.
- Diameter: A diameter greater than 6 mm is characteristic, although some melanomas may have smaller diameters; any growth in a nevus warrants an evaluation.
- Evolving: Changes in the lesion over time are characteristic; this factor is critical for nodular or amelanotic (nonpigmented) melanoma, which may not exhibit the classic criteria above.

Melanoma - Diagnosis

- The European Society for Medical Oncology (ESMO) recommends that diagnosis of malignant melanoma be based on:
- A full-thickness excisional biopsy with a small side margin
- Processing by an experienced pathology institute
- The histology report should follow the WHO classification and include:
  - Maximum thickness in millimetres
  - Level of invasion
  - Presence of ulceration
  - Presence and extent of regression
  - Clearance of surgical margins.

Skin Anomalies..

Fungating Cancers

- Definition
  - Primary, secondary or recurrent malignant diseases can result in a wound that may be referred to as:
  - Fungating wounds
  - Malignant cutaneous wounds
  - Malignant wounds
  - Malignant lesions
  - Neoplastic lesions
  - Tumour necrosis
  - Ulcerating cancerous wounds
  - Ulcerating tumours

Fungating Ca - Aetiology

- Fungating wounds may result from primary, secondary or recurrent malignant disease.
- The skin is infiltrated by a local tumour or from the metastatic spread of a primary tumour.
- Fungating wounds relates to the infiltration and proliferation of the epidermis and the supporting blood vessels and lymph vessels by malignant cells.

(Frocott & Cowley, 2001; Mortimer, 1998).

Fungating Ca – clinical presentation

- In a fungating wound tissue destruction occurs, which often presents as a deep necrotic ulcer with small raised nodules that develop into necrotic ‘cauliflower-like’ structure or growth.
- The growth proliferates and causes loss of vascularity leading to tissue necrosis (Grocott & Cowley, 2001; Mortimer, 1998).
- Fungating wounds can also present as highly vascular lesions protruding beyond the epidermis which have a tendency to bleed easily, produce significant exudate, damage the surrounding skin and produce a noxious odour related to tissue necrosis and proliferation of anaerobic bacteria.
Growing fungating lesions impair lymphatic drainage and tissue perfusion causing cellular anoxia (absence of oxygen) and necrosis.

Research shows that developing tumours reach a threshold size of around 1–2mm³ beyond which the diffusion of oxygen, nutrients and waste products within surrounding tissues is inadequate to maintain viable cellular growth of normal cells.

The lack of diffusion leads to a central area that is hypoxic (low in oxygen) and hypoglycaemic (low in energy) resulting in extensive cell death.

Additional growth of the tumour is controlled by factors released from local cells that activate endothelial cells and promote angiogenesis (Crowther et al., 2001).

The rapid growth of tumour cells alters the extracellular fluid pH, which disturbs the coagulation process to cause blood vessel occlusion, ischaemia and necrosis.

The necrotic tissue provides an environment that promotes the growth of anaerobic and aerobic microorganisms that produces malodour.

The fragility of tumour capillaries increases the risk of bleeding (Adderley & Smith, 2007).

Exudate results from:

- Abnormal capillary permeability
- The secretion of vascular permeability factor by tumour cells
- The breakdown of necrotic tissue by bacterial proteases

(Lazelle-Ali, 2007)
FC - Diagnosis

- The European Society for Medical Oncology (ESMO) recommends that diagnosis of malignant cutaneous tumours be based on:
  - A full-thickness excisional biopsy with a small side margin
  - Processing by an experienced pathology institute
  - The histology report should follow the WHO classification and include:
    - Maximum thickness in millimetres
    - Level of invasion
    - Presence of ulceration
    - Presence and extent of regression
    - Clearance of surgical margins.
Marjolin Ulcer

Squeezing: Compression
The application of external compression initiates a variety of complex physiological and biochemical effects involving the venous, arterial and lymphatic systems.

Provided that the level of compression does not adversely affect arterial flow and the right application technique and materials are used, the effects of compression can be dramatic.

Compression

Forms of compression bandages

- Bandages
- Hosiery
- Intermittent CT

Provided that the arterial inflow remains at the same level, a reduction in venous cross section will increase velocity (the product of diameter and flow velocity is constant).

Duplex ultrasound scan of vena saphena parva: no compression

Initial narrowing of vena saphena parva at 35-40 mmHg

Complete occlusion of vena saphena parva at 50-70 mmHg

Compression therapy is a "mobile therapy" and its success largely depends on patient compliance.

Pressures

Pressures [working and resting / supine & upright]

Arterial v Venous disease

- Determining difference between arterial and venous disease is very important
- If compression therapy is applied over an arterial ulcer then limb could be lost
- If no compression is applied/ no rest implemented unlikely that a venous ulcer will ever heal

Doppler assessment and ABPI

ABPI < 0.8 = arterial disease

Warning – arterial sclerosis can give a false high !!!
Impact

What graduated sustained compression DOES

Graduated sustained compression =

• Improved venous return via increased venous velocity and a reduction in venous regurgitation
• Increased return of metabolites and water to venous system at venular end of capillary
• Improved lymphatic flow facilitating reduction in oedema
• Amplification of foot and calf-muscle pump function via compression of venous system
• Re-establishment of normal oncotic and osmotic pressure within and between venous system and interstitium

The toilet analogy

• Failure of the venous system leads to a build-up of metabolites in the lower limbs
• Reduced toxin clearance
• Reduced healing capacity
• Contributes to wounds stalling in the inflammatory stage of healing
• Wounds become chronic in true definition of term
• Compression is like finding a way to flush the toilet
• Does that make wound managers plumbers?
30% reduction in SA with compression in 13 days

Evidence

Cochrane


International Consensus

Bandage characteristics defined by:

- **'P.L.A.C.E'** = Pressure, Layers, Components, Elastic properties
- Pressure – measured medial gaiter – trend towards standing as a standard measurement position
- Layer – double layer overlap of 50%; more layers and overlap result in multi-layer bandage
- Components – different materials that may have different functions e.g. padding, pressure application, retention; interaction between components will result in friction changing the sum effect of parts
- Elastic properties – inelastic or elastic depending on components used and number of combined layers which tend to increase rigidity (SSI)

**AWMA Guidelines**

- AWMA is currently working on National guidelines which will be endorsed by NHMRC:
  - National expert panel convened
  - Literature review completed
  - Guideline writing – reviews in progress
  - Designation of levels of evidence under headings like: Prevalence, pathophysiology, treatment, recurrence, prevention
  - Expected publication – 2011 October

**International Guidelines**

- [http://www.emedicine.com/DERM/topic474.htm](http://www.emedicine.com/DERM/topic474.htm)
- [http://www.wocn.org/pdfs/WOCN_Library/Fact_Sheets/C_VENINS.pdf](http://www.wocn.org/pdfs/WOCN_Library/Fact_Sheets/C_VENINS.pdf)